

PBEEEP

State Government

Public Buildings Enhanced Energy Efficiency Program

SCREENING RESULTS FOR ANOKA METRO REGIONAL TREATMENT CENTER



7/19/2011

Summary Table

Anoka Metro Regional Treatment Center	
Location	3301 7 th Ave North Anoka MN 55303
Facility Manager	Alan VanBuskirk
Number of Buildings	13
Interior Square Footage	483,457
PBEEEP Provider	Center for Energy and Environment (Neal Ray)
Date Visited	February 16, 2011
Annual Energy Cost (from B3)	\$499,831.65 (2010)
Utility Company	City of Anoka (electric) Xcel Energy (gas)
Site Energy Use Index (from B3)	92.2 kbtu/sq ft
Benchmark EUI (from B3)	125.9 kbtu/sq ft

Screening Overview

The goal of screening is to select buildings where an in-depth energy investigation can be performed to identify energy savings opportunities that will generate savings with a relatively short (1 to 5 years) and certain payback. The screening of the Anoka Metro Regional Treatment Center (AMRTC) was performed by the Center for Energy and Environment (CEE) with the assistance of the facility staff. A walk-through was conducted on February 16, 2011 and interviews with the facility staff were carried out to fully explore the status of the energy consuming equipment and their potential for recommissioning. This report is the result of that information.

AMRTC is a 483,457 square foot (sqft) building complex located in Anoka, MN. The buildings primarily consist of housing for residence.

Recommendation for Investigation

An investigation of the energy usage and energy savings opportunities of the Anoka Metro Regional Treatment Center is not recommended because of the lack of a building automation system.

Building Name	State ID	Square Footage	Year Built
A Building	H552003301a	205,564	1999
Cronin	H5520000037	27,332	1980
Food Service	H5520000017	67,574	1959
LIFT STA. MC5 Miller	H5520000022	224	1951
LIFT STA. MC7 Miller	H5520000025	200	1951
Maintenance Storage Building	H55200000MS	2,400	1960
Miller	H5520000018	74,978	1951
Service Tunnel	H5520000041	5,000	1951
Storage Building Garage/Office	H5520000039	900	1960
Storage Building	H5520000038	2,046	1951
Unit B & C	H552003301b	34,413	1999
Units D & E	H552003301d	31,413	1999
Units G & H	H552003301g	31,413	1999

Building Overview Section

Mechanical Equipment

The building contains 3 steam boilers for heat. The steam is converted to hot water at two steam to hot water heat exchangers. There are two chillers used for cooling when required which contain a cooling tower associated with 2 condenser water pumps. The complex is primarily one building which is attached and is comprised of 22 AHUs. Of these 22 AHUs, 19 of them contain VFDs to vary there airflow. There are a total of 511 VAV boxes in this complex.

There is a separate detached building called Miller Building. This building receives steam generated from Anoka County and delivered to it through steam tunnels. There are two Roof top units which serve this building which contain steam coils and DX units for cooling. There are also four condensate pumps located in the basement of this building. This building equipment was not included in the summary report below.

The following table lists the key mechanical equipment at the facility.

Mechanical Equipment Summary Table	
Quantity	Equipment Description
483,457	Interior Square Feet
22	Air Handlers
511	VAV Boxes
22	Exhaust Fans
4	Power Roof Ventilators
16	Unit Heaters
5	Water Heaters
3	Steam Boilers
2	Steam to Hot Water Heat Exchanger
4	Hot Water Pumps
2	Primary Chilled Water Pumps
2	Secondary Chilled Water Pumps
2	Condenser Water Pumps
2	Water Cooled Chillers
1	Cooling Tower
4	Domestic HWPs

Controls and Trending

The building is operated by a pneumatic system and is not automated. Staff at the complex has very limited control over how the system operates.

Lighting

Indoor lighting- Interior lighting primarily consists of T8 lamps. Most of the lamps are 32 watt and some of them are 25 watt. The lights are controlled by switches mainly.

Outdoor lighting- The outdoor lighting consists of high pressure sodium (HPS).

Energy Use Index B3 Benchmark

The reported site Energy Use Index (EUI) for the building is 92 kBtu/sqft, which is 26% lower than the B3 Benchmark of 126 kBtu/sqft. The site EUIs for State of Minnesota buildings are 23% lower than their corresponding B3 Benchmarks on average. This shows the Anoka Metro Regional Treatment Center is already more efficient than the average state building and in not a good candidate for a PBEEEP investigation.

Metering

The building contains one electrical meters and one natural gas meter.

Documentation

The complex contains as buildings for the 1999 building complex and a testing and balance report for this entire complex

Additional Information from Occupants Interviews and Observations

The following information **has not been verified** and was obtained through occupant interviews and/or general observations by the PBEEEP Screening team. This information is provided for reference only:

- With the pneumatic system staff cannot monitor the system very well and when issues happen it is more difficult for them to determine the source of the problem.

Reasons for No Recommendation

This screening report is based on the PBEEEP Guidelines. It is based on one site visit, review of the facility documentation, and, a limited inspection of the facility and interviews with the staff. The purpose of the screening report is to evaluate the potential of the facility for the implementation of cost-effective energy efficiency savings through recommissioning. To the best of our knowledge the information here is accurate. It provides a high level view of many of the important parameters of the mechanical equipment in the facility. Because it is the result of a limited audit survey of the facility, it may not be completely accurate or inclusive.

The main reason this complex was not recommended is because the entire complex is run on a pneumatic system. A recommissioning study requires trending of all major mechanical equipment; without an automation system, all trending would have to be done with data logging which would be extremely expensive and unlikely to be justified by the energy savings found. Data logging would be required to first determine measures from a recommissioning study, and then more logging would be required to verify the measures were implemented. After the measure was implemented there would be no way for the operators to determine if they consistently operate as intended. These factors were the primary reason this complex was not recommended for an investigation.

Building Summary Table

The following tables are based on information gathered from interviews with facility staff, a building walk-through, automation system screen-captures, and equipment documentation. The purpose of the tables is to provide the size and quantity of equipment and the level of control present in each building. It is complete and accurate to the best of our knowledge.

Anoka Metro Regional Treatment Center					
Area (sqft)	483,457	Year Built	1951-1999	EUI/Benchmark	
HVAC Equipment					
Air Handlers (Total)					
Description	Type	Size	Notes		
AHU-NW1	Variable air volume	10,600 CFM 15 HP SF 5 HP RF	Contains a VFD on the SF and RF. 26 VAV boxes		
AHU-NW2	Variable air volume	2,000 CFM 1.5	Contains a VFD on the SF. RF does not contain a VFD. 5 VAV boxes		
AHU-NW4	Variable air volume	5,000 CFM 7.5 HP SF	Contains a VFD on the SF		
AHU- NW6	Variable air volume	8,000 CFM 10 H	Contains a VFD on the SF and RF 28 VAV boxes		
AHU-NW7	Variable air volume	9,800 CFM 15 HP SF	Contains a VFD on the SF and RF 24 VAV boxes		
AHU-NW8	Variable air volume	2,000 CFM 2 HP SF	Contains a VFD on the SF and RF 11 VAV boxes		
AHU-SE1	Variable air volume	8,000 CFM 10 HP SF	Contains a VFD on the SF and RF. Contains 26 VAV boxes.		
AHU-SE2	Variable air volume	8,000 CFM 10 HP SF	Contains a VFD on the SF. RF does not contain a VFD. 9 Reheats		
AHU-SE3	Variable air volume	12,000 CFM 15 HP SF	Contains a VFD on the SF and RF 43 VAV boxes		
AHU-SE4	Variable air volume	8,050 CFM 10 HP SF	Contains a VFD on the SF and RF 22 VAV boxes		
AHU-SE5	Variable air volume	22,500 CFM 30 HP SF	Contains a VFD on the SF 9 Reheats		

HVAC Equipment Cont'd

Air Handling Units (Con't)

Description	Type	Size	Notes
AHU-SE7	Variable air volume	8,000 CFM 7.5 HP SF 3 HP RF	Contains a VFD on the SF and RF 6 VAV boxes
AHU-B	Variable air volume	17,500 CFM 20 HP SF 10 HP RF	Contains a VFD on the SF and RF 53 VAV boxes
AHU-C	Variable air volume	17,500 CFM 20 HP SF 10 HP RF	Contains a VFD on the SF and RF 51 VAV boxes
AHU-D	Variable air volume	17,500 CFM 20 HP SF 10 HP RF	Contains a VFD on the SF and RF 58 VAV boxes
AHU-E	Variable air volume	17,500 CFM 20 HP SF 10 HP RF	Contains a VFD on the SF and RF 51 VAV boxes
AHU-G	Variable air volume	17,500 CFM 20 HP SF 10 HP RF	Contains a VFD on the SF and RF 53 VAV boxes
AHU-H	Variable air volume	17,500 CFM 20 HP SF 10 HP RF	Contains a VFD on the SF and RF 50 VAV boxes
AHU-ES	Variable air volume	4,400 CFM 5 HP SF	SF contains inlet guide vanes
AHU-K1	Variable air volume	4,250 CFM 7.5 HP 3 HP RF	Contains a VFD on the SF
AHU-K2	Constant volume	2,000 CFM 5 HP SF	
AHU-NS	Variable air volume	4,400 CFM 5 HP SF	SF contains inlet guide vanes

HVAC Equipment Cont'd

Hot Water System

Description	Type	Size	Notes
Boiler-1	Steam Boiler	6,900 lbs/hr	
Boiler-2	Steam Boiler	13,800 lbs/hr	
Boiler-3	Steam Boiler	13,800 lbs/hr	
HX-1	Steam to hot water heat exchanger	11,700 lbs/hr	
HX-2	Steam to hot water heat exchanger	9,293 lbs/hr	
Pump-1 and Pump-2	Hot water pumps	100 HP 1,150 gpm	
Pump-3 and Pump-4	Glycol hot water pumps	50 HP 1,020 gpm	
Boiler Feed Pump #1	Feed water Pump	3 HP 56 gpm	
Boiler Feed Pump #2	Feed water Pump	3 HP 56 gpm	
Boiler Feed Pump #3	Feed water Pump	1.5 HP 28 gpm	
Boiler Feed Pump #4	Feed water Pump	3 HP 56 gpm	
Fuel Oil Pump #1	Fuel oil pump	3 HP 30 gpm	
Pump -5 and Pump-5A	Domestic HWP	1.5 HP 90 gpm	
Pump-6 and Pump-6A	Domestic HWP	1.5 HP 90 gpm	

Chilled Water System

Description	Type	Size	Notes
Chiller-1	Water cooled	~500 tons	
Chiller-2	Water cooled	~500 tons	
CHWP-1	Secondary pump	40 HP 1,000 gpm	
CHWP-2	Secondary pump	40 HP 1,000 gpm	
Condenser Pump-1	Condenser pump	20 HP 1,200 gpm	
Condenser Pump-2	Condenser pump	20 HP 1,200 gpm	
Primary Pump-1	Primary pump	10 HP 1,000 gpm	
Primary Pump-2	Primary pump	10 HP 1,000 gpm	
Cooling Tower Fan-1 and 2		Unknown design conditions	

HVAC Equipment Cont'd

Chilled Water System

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Chiller-1	Water cooled	~500 tons	
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Condenser Pump-1	Condenser pump	20 HP 1,200 gpm	
Condenser Pump-2	Condenser pump	20 HP 1,200 gpm	
Primary Pump-1	Primary pump	10 HP 1,000 gpm	
Primary Pump-2	Primary pump	10 HP 1,000 gpm	
Cooling Tower Fan-1 and 2		Unknown design conditions	
Cooling Tower		Unknown design conditions	

HVAC Equipment Cont'd

VAV boxes (511 Total)

Description	Type	Size	Notes
VAV	Reheats	400 to 5,000 CFM	

Exhaust Fans (22 Total)

Description	Type	Size	Notes
Exhaust Fans	Constant volume	1,400 to 5,200 CFM	

Unit Heaters (16 Total)

Description	Type	Size	Notes
Unit Heaters	Steam or Water	10 to 44 kBtu/hr	

Cabinet Unit Heaters (3 Total)

Description	Type	Size	Notes
Cabinet Unit Heaters	CUHs	46.3 to 69.8 kBtu/hr	

Power Roof Ventilator (4 Total)

Description	Type	Size	Notes
PRV	Exhaust hoods	Each rated at 5,000 CFM	

Water Heater Schedule (5 Total)

Description	Type	Size	Notes
Water Heaters	Steam	3,500 lbs/hr	

Points on BAS

System is completely pneumatic operated

PBEEP Abbreviation Descriptions			
AHU	Air Handling Unit	HUH	Horizontal Unit Heater
BAS	Building Automation System	HRU	Heat Recovery Unit
CD	Cold Deck	HW	Hot Water
CDW	Condenser Water	HWDP	Hot Water Differential Pressure
CDWRT	Condenser Water Return Temperature	HWP	Hot Water Pump
CDWST	Condenser Water Supply Temperature	HWRT	Hot Water Return Temperature
CFM	Cubic Feet per Minute	HWST	Hot Water Supply Temperature
CHW	Chilled Water	HX	Heat Exchanger
CHWRT	Chilled Water Return Temperature	kW	Kilowatt
CHWDP	Chilled Water Differential Pressure	kWh	Kilowatt-hour
CHWP	Chilled Water Pump	MA	Mixed Air
CHWST	Chilled Water Supply Temperature	MA Enth	Mixed Air Enthalpy
CRAC	Computer Room Air Conditioner	MARH	Mixed Air Relative Humidity
CUH	Cabinet Unit Heater	MAT	Mixed Air Temperature
CV	Constant Volume	MAU	Make-up Air Unit
DA	Discharge Air	OA	Outside Air
DA Enth	Discharge Air Enthalpy	OA Enth	Outside Air Enthalpy
DARH	Discharge Air Relative Humidity	OARH	Outside Air Relative Humidity
DAT	Discharge Air Temperature	OAT	Outside Air Temperature
DDC	Direct Digital Control	Occ	Occupied
DP	Differential Pressure	PTAC	Packaged Terminal Air Conditioner
DSP	Duct Static Pressure	RA	Return Air
DX	Direct Expansion	RA Enth	Return Air Enthalpy
EA	Exhaust Air	RARH	Return Air Relative Humidity
EAT	Exhaust Air Temperature	RAT	Return Air Temperature
Econ	Economizer	RF	Return Fan
EF	Exhaust Fan	RH	Relative Humidity
Enth	Enthalpy	RTU	Rooftop Unit
ERU	Energy Recovery Unit	SF	Supply Fan
FCU	Fan Coil Unit	Unocc	Unoccupied
FPVAV	Fan Powered VAV	UH	Unit Heater
FTR	Fin Tube Radiation	VAV	Variable Air Volume
GPM	Gallons per Minute	VFD	Variable Frequency Drive
HD	Hot Deck	VIGV	Variable Inlet Guide Vanes
HP	Horsepower	VUH	Vertical Unit Heater

Conversions

1 kWh = 3.412 kBtu

1 Therm = 100 kBtu

1 kBtu/hr = 1 MBH

